ENTOMOLOGICAL NEWS

OCTOBER 1943

Vol. LIV **No. 8**

CONTENTS

Rodeck—Antennal anomaly in Nomada vicina (Hymenoptera) 175
Sabrosky—A new species of and notes on Acroceridae (Diptera) 176
Dalmat—Synonymic notes on some species of Cuterebra (Diptera) 182
Uvarov—War losses of Russian entomology 183
Emerson & Miller—A key to the termites of Florida 184
Camras—Notes on the No. American species of the Zodion Obliquefasciatum Group (Diptera) 187
Rehn—Notes on Hubbellia marginifera (Orthoptera) 191
Worth—Ecological studies of Ceratomia catalpae larvae (Lepidoptera) ... 193
Current entomological literature 202

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $3.00 domestic; $3.30 foreign; $3.15 Canada. Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage prescribed for in Section 1, Act of October 3, 1917, authorized January 15, 1921.

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Subscription price, per yearly volume of 10 numbers: Domestic, including Mexico, $3.00; Foreign, $3.30; Canada, including Newfoundland and Labrador, $3.15; all other countries, $3.30—U. S. Currency.

ADVERTISING RATES: Full width of page. Payments in advance.

	1 Inch	2 Inches	3 Inches	6 Inches
One Issue	$1.00	$ 1.90	$ 2.75	$ 4.80
Five Issues	4.50	8.50	12.00	21.00
Ten Issues	8.00	15.00	21.00	36.00

MANUSCRIPTS, ADVERTISEMENTS, SUBSCRIPTIONS: All communications and remittances to be addressed to **ENTOMOLOGICAL NEWS, 1900 Race Street, Philadelphia 3, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. If not accepted, authors will be so advised and postage requested for return of manuscripts. Articles longer than six printed pages may be published in two or more installments, unless the author is willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at 1900 Race Street, Philadelphia 3, Pa., U. S. A.

SEPARATES of articles without covers, without extraneous matter, will be furnished by the printer at the following prices: 1–4 pages, 25 copies, $2.50; 50 copies, $2.50; 100 copies, $3.00. 5–8 pages, 25 copies, $4.00; 50 copies, $4.00; 100 copies, $4.75. 9–12 pages, 25 copies, $6.25; 50 copies, $6.25; 100 copies, $7.25. Covers: first 50, $2.75; additionals at 2 cents each. Plates, printed on one side: first 50, $2.00; additionals at ½ cent each. Transportation charges will be extra. THE LANCASTER PRESS, INC., Lancaster, Pa.

ENTOMOLOGICAL NEWS

VOL. LIV OCTOBER, 1943 No. 8

Antennal Anomaly in Nomada vicina Cresson (Hym.: Apoidea).

By HUGO G. RODECK, Univ. of Colo. Museum, Boulder, Colorado.

In Cresson's catalog of his types of Hymenoptera in the Academy of Natural Sciences (p. 133) the female lectotype of *Nomada vicina* is described as having the "right antenna off." During an examination of the specimen (May 28, 1941) I found that the appendage was not only missing but was never present in the life of the insect.

The face of this specimen is shorter and broader than is usual in the species. The left antenna is present, with its fovea located in a normal concavity of the face between the inner orbit and the median facial carina. In consequence of the shortness of the face, this fovea is somewhat lower on the face than usual, mostly at the expense of the supraclypeus.

In the corresponding position on the right side of the face, however, the antennal fovea is completely absent. The surface here is much less concave than in the normal insect and is punctured like the rest of the face. But below and laterad of the position of the missing antenna is a deep hole, smaller than a normal antennal fovea, and apparently an upward and mediad invagination of the integument of the face. So far as can be seen it is haired and punctured normally inside, and is ferruginous, the red color also forming a ring around the opening on the face. This ring of color interferes with the normal distribution of the red color of the lateral facemarks which are interrupted on this side of the face to leave a complete zone of black around the red rim of the invagination.

A New Species of and Notes on Acroceridae (Diptera).[1]

CURTIS W. SABROSKY, Michigan State College.

An intensive study of the family Acroceridae was undertaken in order to try to determine some available material. The results proved to be so revolutionary in *Acrocera* and *Ogcodes* that a paper has been prepared dealing with those genera in considerable detail. The notes presented here are miscellaneous items which were not pertinent to the larger work.

Pialeoidea gloriosa new species.

Head black, the eyes and vertex rather thickly beset with long brown to brownish yellow hairs; antennae entirely black, their appearance similar to Fig. 12b in Cole (1919),[2] the second segment with numerous long hairs above, and the third segment elongate and clavate, but in this case the latter bears a group of five short setae at its apex.

Thorax and scutellum bright golden-yellow, only the lower halves of the pleura, the pteropleura, and a stripe ventrad of each anterior spiracle, brown, the whole thickly covered with long, erect yellow hair. First abdominal segment concolorous with the thorax, and bearing the same yellow hair; the remainder of the abdomen is shining, dark metallic blue-black, densely covered with short dark hairs; the entire venter apparently dark brown.

Legs brown, tarsi somewhat paler, the claws black and strong, twice as long as the pulvilli; the legs are densely covered with hairs, which are very long on the coxae, only moderately long on the femora, and short and appressed on the tibiae and tarsi.

Wings short for a fly of this size, barely exceeding the apex of the abdomen, with slightly browned membrane and dark brown to black veins. The venation is approximately the same as figured by Cole (1919, Fig. 14c) for *Ocnaea coerulea*, ex-

[1] Journal Article No. 642 (n. s.) from the Michigan Agricultural Experiment Station.

[2] Cole, 1919, The dipterous family Cyrtidae in North America, *Trans. Amer. Ent. Soc.*, 45: 1–79, 15 pls.

cept that the posterior branch (R_5) of the third vein joins with the vein immediately behind it (M_1), so that the first posterior cell is closed and petiolate. Halteres dark brown. Squamae of only moderate size, pale yellow with darker yellow margins, the upper surfaces and margins densely clothed with pale yellow hairs which are concolorous but somewhat shorter than those on the thorax.

Length, 13 mm.; length of wing, 11 mm.; length of third antennal segment, 2 mm.

Holotype, female (apparently), Brazos County, TEXAS, Oct. 20, 1940 (R. W. Strandtmann) [Texas A. & M. College Colln.]. In am indebted to Mr. H. J. Reinhard for the loan of this interesting specimen.

The genus *Pialeoidea* was erected by Westwood in 1876 for *Cyrtus magnus* Walker from Georgia. The present specimen shows the same type of antennae, with the terminal setae, as described and figured by Westwood. Of the two species cited in Cole's monograph (1919, p. 21), *P. magna* (genotype) has the disk of the thorax bronze-black, and *P. metallica* Williston has a metallic green thorax and scutellum, with brown abdomen. Nor does any described species of the related genus *Ocnaea* have a color pattern at all like that of the present form. Specimens of the genus *Pialeoidea* must be quite rare, for Cole does not mention seeing any specimens of the above species, and I have found no records in the literature.

OPSEBIUS PTERODONTINUS O. S.

Besides the costal spur, the species is readily distinguished by the dense golden-yellow body hairs, contrasted with the whitish hairs of other eastern species. The specimens which I have seen appear to be males, and it is possible, as in *Pterodontia,* that the costal spur is a sexual character and the females are known under another name. Of the two other eastern species, *O. sulphuripes* seems to be the more likely possibility as it has the same type of wing venation (anal cell open, short third posterior cell), whereas *O. gagatinus* has the anal cell closed, and a long third cell. Both differ from *pterodontinus* in having whitish body hairs, but sexual dimorphism in that respect is not impossible.

The few records indicate a rather wide distribution in eastern United States. Unpublished data: Oakwood, Ill., Sept. 18, 1928 (H. H. Ross) [Ill. Nat. Hist. Survey Colln.]; Enfield, N. Y., Aug. 4, 1923, and Top of Mt. Marcy, N. Y., Sept. 1, 1942 (Henry Dietrich) [Cornell Univ. Colln.]; Ann Arbor, Mich., Aug. 1, 1927 (N. K. Bigelow) [Univ. Mich., Mus. Zool., det. by George Steyskal]. Besides these, I have examined specimens from White Cap Mt., Maine, Canobie Lake, N. H., Amherst, Mass., and Tiverton, R. I., which were included in the records of Johnson (1925).[3]

OPSEBIUS SULPHURIPES Loew.

Apparently distinguished from *pterodontinus* by whitish body hairs, but there is a possibility that they are opposite sexes of the same species. New records: Urbana, Ill., Aug. 17, 1920 [Ill. Nat. Hist. Survey]; College Station, Texas, Nov. 5, 1920 (H. J. Reinhard) [Texas A. & M. College Colln.]; besides which I have examined the three specimens recorded by Johnson (1925). It is thus apparently widely distributed in eastern United States, although quite rare, for Cole (1919) records seeing only two individuals in preparation for his monograph.

OPSEBIUS DILIGENS O. S.

The specimens from Giant Forest, Calif. (J. C. Bradley) [Cornell Univ.], mentioned by Cole (1919, p. 47) as a species near *paucus* but having a closed anal cell, have been examined and may be recorded as *O. diligens*. They agree in every way with California specimens of typical *diligens* kindly sent me by Mr. George E. Bohart, but both specimens are in poor condition and rather discolored, the hairs matted, and the wing veins and membrane darker than usual.

PTERODONTIA FLAVIPES Gray (= *Pterodontia flavoscutellata* Steyskal, 1941).

Hardy (1942) recently published the above synonymy, and I agree from a study of the series before me. *Flavoscutellata* represents the male sex, in which the basal two or three abdomi-

[3] Johnson, 1925, List of the Diptera or two-winged flies of New England, 326 pp. (Cyrtidae, 106–108).

nal segments are normally more extensively infuscated than in the females. Cole (1919, fig. 22) illustrated the female only, but an excellent figure of the typical abdominal color pattern of the male was given by J. L. King in an extensive paper on the life history of *P. flavipes*.[4]

I find also that the sexes differ in the typical color pattern of the legs. The males have the front femora entirely deep yellow, rarely blackened narrowly at their bases, whereas in the females the front femora are more or less extensively infuscated, varying from the basal half to all but the knees. In both sexes, the mid and hind femora are black, and all tibiae and tarsi yellow. This characteristic pattern of the legs of the males is mentioned by Westwood and Cole for *P. flavipes* and by Steyskal for *P. flavoscutellata*, and I find it is also true for the northwestern species, *P. misella*.

Some variation in color pattern should be recorded. On the dorsum of the abdomen in the males, the first segment is entirely black; the second is usually entirely black but may have two orange triangles along the hind margin, with their apices directed forward, their size varying from mere traces of color to large spots nearly one third the length of the segmental dorsum; the third segment is chiefly orange yellow with a median black stripe which varies in occupying from perhaps one seventh to one fourth the width of the segment, touching both fore and hind margins of the segment in equal breadth except in one specimen where it narrows slightly and fails to touch the hind margin; the fourth segment is entirely orange in some examples, but in others there is a narrow median stripe, linear to fusiform, as figured by King (1916, pl. 15, fig. 2).

The abdominal color pattern of the females which I have seen agrees fairly well with Cole's figure, and seems to vary less than in the males. The fourth segment is entirely yellow and the second and third are predominantly so, each of the latter having a small black spot along the fore margin of the segment, the black produced posteriorly on the median line, though never reaching the hind margin of the segment. Two females (Mich., N. Dak.) have the second segment broadly black.

[4] Annals Ent. Soc. Amer., 9: 309–321, pl. 15, fig. 2, 1916.

It may also be noted here that the number of terminal setae on the antennae is subject to considerable variation, and that the usually stated number of three setae is not always true. Neither are the numbers on right and left antennae always the same, though breakage may in some cases have accounted for this. In the following list the first number is for the right antenna, the second for the left:—males, 3–3, 2–3, 2–3, 4–5, 6–6, 3–3, 7–7; females, 2–3, 4–3, 3–2, 3–4, 4–3, 2–3.

Variation in size:—males, 5.5–10.5 mm.; females, 5–9 mm.

New records of distribution: ♂, "Ill." [Acad. Nat. Sci. Phila.]; ♂, Algonquin, Ill., July 26, 1895 [Ill. Nat. Hist. Survey Colln.]; ♀, Brunswick, Ga., Sept., 1881 [Acad. Nat. Sci. Phila.]; ♀, Cheboygan Co., Mich., July 25, 1927 (L. K. Gloyd) [Univ. Mich., Mus. Zool.]; ♂, Cheboygan Co., Mich., July 11, 1941, found dead in spider web (C. W. Sabrosky) [Author's Colln.]; 4 ♂, 1 ♀, Cheboygan Co., Mich., July 2, 1939 (David M. Gates), Aug. 16, 1936 (E. A. Hutz), June 27, 1932 ("H. F."), July 5, 1934 (H. B. Hungerford), and July 22, 1940 (R. I. Sailer) [Snow Colln., Kans. Univ.]; ♀, Valley City, N. Dak., July 17, 1917 (P. W. Fattig) [Fattig Colln.]; ♂, Paris, Maine, June 15, 1938 (C. A. Frost) [Boston Soc. Nat. Hist.]. Besides these, I have seen specimens from Boothbay Harbor, Maine, Hampton, N. H., and Lunenburg, Mass. [Boston Soc. Nat. Hist.] which were included in the records published by Johnson (1925).

PTERODONTIA MISELLA O. S.

Pterodontia misella Osten Sacken, 1887, Western Diptera, p. 277 (Oregon). (♂).

Nothra americana Bigot, 1889, Ann. Soc. ent. France, p. 320. (Wash.). New synonym. (♂ ?).

Pterodontia johnsoni Cole, 1919, Trans. Amer. Ent. Soc. 45: 42 (Wash., Idaho). New synonym. (♀).

Cole's monograph does not sharply distinguish *P. misella* and *P. flavipes,* but material before me indicates that these are two distinct species. They apparently occupy quite different areas, if we may risk a statement from limited material, with *flavipes*

ranging from Georgia to North Dakota, whereas all records of *misella* are from the Pacific Northwest (Wash., Ore., Idaho, B. C.).

The males of the two species are quite similar, as Cole noted, particularly in the color pattern of the abdominal dorsum. I find also that the color of the legs in both sexes follows that noted for *flavipes*. The wing venation is similar, though in the males the costa is not always as strongly produced into a spur as in *flavipes*. The chief distinguishing features are as follows:

P. flavipes	*P. misella*
1. Large species: average size 7.58 mm., range 5–10.5 mm.	1. Smaller species: size of nine examples consistently 5–5.5 mm.
2. Scutellum yellowish to brown, rarely brownish black, always distinctly lighter in color than the thorax.	2. Scutellum coal black, occasionally slightly orange at the extreme apex, usually so dark that it does not sharply contrast with the thorax as in *flavipes*.
3. Male abdomen: dorsum of fourth segment usually orange, or with only a narrow median vitta; fifth segment entirely orange.	3. Male: dorsum of fourth segment usually with a distinct median vitta, and sometimes a slight streak on the fifth.
4. Female: abdomen more predominantly orange than in the male (Cf. Cole, 1919, Fig. 22).	4. Female: abdomen entirely black, or pitch black.
5. Eastern species (Ga.–N. Dak.).	5. Pacific Northwest, from available records.

Cole (1919, p. 42, 43) suggested that Bigot's species might be the same as *P. misella,* and after the study of *flavipes* vs. *misella,* I so refer it to synonymy. *P. johnsoni* proved to be the dark female of the sexually dimorphic *misella.*

Additional records of *P. misella:* 6 (5 ♂, 1 ♀), Lake Cushman, Mason Co., Wash., July 29 and Aug. 6, 1919 (F. M. Gaige) [Univ. Mich., Mus. Zool.]; 1 ♂, "Wash." and 2 (♂, ♀), Vancouver, B. C., July 11, 1929 (H. H. Ross) [Ill. Nat. Hist. Survey Colln.].

PTERODONTIA ANALIS Westw. and P. VIX Tns.

Cole placed Townsend's species from Southern California as a synonym of *P. analis* Westwood, described from Georgia. I

have seen no specimens which might be referred to either name, but from present information on the distribution of species in this family, I should question the synonymy. Species from those widely separated areas are probably distinct, although superficially they may be quite similar.

Synonymic Notes on Some Species of Cuterebra (Diptera; Cuterebridae).

HERBERT T. DALMAT, Division of Medical Entomology, Cornell University.

Townsend (Insecutor Inscitiae Menstruus *4:* 25, 1917) considered both *Cuterebra horripilum* Clark (An essay on bots of horses and other animals, London, 1815) and *Cuterebra abdominalis* Swenk (N. Y. Ent. Soc. Jour. *13:* 182–183, 1905) as synonyms of *Cuterebra cuniculi* Clark (Linn. Soc. London, Trans. *3:* 299, 1797). He also considered *Cuterebra albifrons* Swenk (N. Y. Ent. Soc. Jour. *13:* 183–184, 1905) to be identical with *Cuterebra princeps* Austen (Ann. and Mag. Nat. Hist., Ser. 6, *15:* 393–395, 1895).

Mrs. Myron H. Swenk kindly made available Dr. Swenk's collection and a study was made of his types. The collections of the U. S. National Museum, American Museum of Natural History, Museum of Comparatize Zoology, and Cornell University Entomological Museum were also studied. Undoubtedly Townsend was correct in considering *abdominalis* Swenk as identical with *horripilum* Clark, and *albifrons* Swenk as synonymous with *princeps* Austen. Swenk, himself, in arranging his collection, had placed his type specimens in with the specimens of the species with which they are synonymous. This decision was easily substantiated by comparing the species.

However, *horripilum* Clark and *cuniculi* Clark cannot be considered identical. Clark separated the two species mainly on the large, black shield present on the mesonotum of *cuniculi,* but absent on *horripilum.* This character was well figured by him. Bau (Konowia *10:* 205–206, 1931) considered this black coloration on *cuniculi* to be due to the thoracic hairs being stuck

together by body fluid, thereby exposing the basic color of the thorax. Apparently Townsend concurs in this. Both in the National Museum collection and in the Cornell University collection there are single specimens of this species that show the black shield-shaped patch of hairs in perfect condition. Both the type specimen and the one in the Cornell University collection were collected in Georgia; the specimen in the National Museum was collected in Florida. There is no doubt that *horripilum* is distinctly separable from *cuniculi.*

Cuterebra scudderi Townsend (Insecutor Inscitiae Menstruus *5: 27–28,* 1917) was described from a male specimen reared from a rabbit. There were also two male paratypes, reared from rabbits, from different localities. Townsend differentiated *scudderi* (males) from females of *Cuterebra buccata* Fabricius (Genera Ins., p. 305, 1776), but a comparison of the types of *scudderi* with males of *buccata,* also reared from rabbits, conclusively shows these species to be identical.

War Losses of Russian Entomology.

According to very incomplete information, the following Russian entomologists have lost their lives as the result of air-raids and shelling of the civil population of Leningrad, Moscow and other cities: A. M. Gerasimov, lepidopterist; A. M. Iljinsky, specialist in insect toxicology; S. A. Predtechensky, orthopterist, well known for his researches on the locust problem; A. N. Reichardt, coleopterist, specialist in Histeridae; V. E. Rédikorzev, insect anatomist and histologist; A. A. Stackelberg, dipterist; S. P. Tarbinsky, orthopterist; "and many others" as is stated in the letter containing this tragic news. The loss of such a high percentage of specialists who were recognised leaders in their respective sphere of entomology is irreparable, the more so that even heavier losses should be feared amongst the younger generation of entomologists who have joined the armed forces. Many entomological laboratories, experimental stations, libraries, etc., have been partly or completely destroyed, but no exact data are as yet available.—B. P. Uvarov, London.

A Key to the Termites of Florida.

By A. E. Emerson and E. M. Miller, University of Chicago and University of Miami.

This key to the termites of Florida has not been published except in mimeographed form for class use. The authors have used the key in practice and it seems to be satisfactory for this area. It is published because it seems likely to be of more general interest.

IMAGOES

1. Three or more parallel chitinized veins near the costal border of the wing 2
   Two parallel chitinized veins near the costal border of the wing 8
2. Median vein much more weakly colored than the radius ..3
   Median vein as strongly colored, or nearly so, as the radius 6
3. Median vein ending near the tip of the wing 4
   Median vein joining the radius about two-thirds the length of the wings from the suture 7
4. Width of head including eyes 1.38–1.65 mm. Length of forewing from costal end of suture 9.40–12.22 mm. Yellow-brown ..... *Kalotermes schwarzi* Banks
   Width of head including eyes 1.23–1.35 mm. Length of forewing from costal end of suture 8.27–9.40 mm. Yellowish .....*Kalotermes snyderi* Light
   Width of head including eyes 1.23–1.27 mm. Length of forewing from costal end of suture 6.75–6.96 mm. Dark brown .....*Kalotermes approximatus* Snyder
   Width of head including eyes .85–.92 mm. Length of forewing from costal end of suture 5.26–5.37 mm. Dark brown .....*Kalotermes milleri* Emerson
5. Radius with numerous branches and cross veins 6
   Radius with few or no branches and cross veins; wing membranes coarsely punctate
   Calcaritermes nearcticus Snyder

6. Hairs on pronotum short, about .06 mm. or less in length; area between ocellus and eye same color as rest of head.
Kalotermes jouteli Banks

Hairs on pronotum longer, about .13–.20 mm. long; area between ocellus and eye, light.
Neotermes castaneus (Burmeister)
(*Neotermes angustoculus* Snyder is now believed to be synonymous with *N. castaneus* since characters formerly used for distinguishing these forms overlap in a graded series of specimens from Paradise Key, the type locality for *angustoculus*.)

7. Width of head with eyes .85–.97 mm.
Cryptotermes cavifrons Banks

Width of head with eyes 1.05–1.15 mm.
Cryptotermes brevis (Walker)

8. Forewing-scale barely overlapping the base of the hind wing-scale; profile of top of head convex 9

Forewing-scale overlapping at least about half the length of the hind wing-scale; profile of head straight.
Prorhinotermes simplex (Hagen)

9. Color of head and body light brown to yellowish brown.
Reticulitermes hageni Banks

Color of head and body dark brown to black 10

10. Ocelli plainly less than their diameter from the eye.
Reticulitermes virginicus Banks

Ocelli either their diameter or more than their diameter from the eye .....*Reticulitermes flavipes* (Kollar)

SOLDIERS

1. Pronotum approximately as wide or wider than the head ..2

Pronotum distinctly narrower than the head 9

2. Junction of front and vertex fairly flat; head not sharply truncate 3

Junction of front and vertex nearly right-angled; head sharply truncate 7

3. Third antennal joint distinctly larger and darker than the second and fourth joints 4

Third antennal joint not conspicuously different from neighboring joints .....*Neotermes castaneus* (Burmeister)

4. Eye pigmented .....*Kalotermes jouteli* Banks
   Eye unpigmented 5
5. Third joint of antennae usually longer than fourth and fifth together (may not apply to soldiers in young colonies); gula proportionately wide in small forms; labrum truncate at tip .....*Kalotermes schwarzi* Banks
   Third joint of antennae about as long as fourth and fifth together; gula proportionately narrow; labrum bluntly pointed at tip 6
6. Anterior margin of pronotum deeply to mediumly emarginate; profile of head with a nearly smooth curve between the front and vertex .....*Kalotermes snyderi* Light
   Anterior margin of pronotum mediumly emarginate; profile of head with obtuse angle between front and vertex; small species; head width about .97–1.06 mm.
   Kalotermes milleri Emerson
   Anterior margin of pronotum slightly emarginate; profile of head with obtuse angle between the front and vertex.
   Kalotermes approximatus Snyder
7. Front slightly oblique, relatively smooth, a deep furrow at the vertex .....*Calcaritermes nearcticus* Snyder
   Front conspicuously concave, more or less roughened 8
8. Top of head somewhat concave and smooth.
   Cryptotermes cavifrons Banks
   Top of head with distinct depression; rough.
   Cryptotermes brevis Walker
9. Sides of head fairly parallel 10
   Sides of head distinctly converging toward the front.
   Prorhinotermes simplex (Hagen)
10. Width of pronotum .81–1.10 mm.
    Reticulitermes flavipes (Kollar)
    Width of pronotum .67–.81 11
11. Gula narrower with more abruptly demarcated anterior portion; specimens usually larger and often with mandible tips more hooked than in next species.
    Reticulitermes virginicus Banks

Gula wider with more gradually demarcated anterior portion; specimens usually smaller and with tips of mandibles less hooked .....*Reticulitermes hageni* Banks

Notes on the North American Species of the Zodion Obliquefasciatum Group (Diptera: Conopidae).

By SIDNEY CAMRAS, Chicago, Illinois.

The present paper is the first contribution based on the study of a large number of specimens of the genera *Zodion* and *Occemyia* from the collections listed below. The material was either borrowed by Field Museum through the courtesy of Orr Goodson, Acting Director, and W. J. Gerhard, Curator of Entomology, or loaned to the author through the kindness of the individuals listed.

C. F. Adams, American Museum of Natural History, California Academy of Sciences, S. Camras, Chicago Academy of Sciences (H. K. Gloyd), Colorado State College (M. T. James), H. Dybas, Field Museum, Illinois State Natural History Survey (H. H. Ross), Iowa Wesleyan College (H. E. Jaques), B. Krogh, Museum of Comparative Zoology, North Carolina Department of Agriculture (C. S. Brimley), Academy of Natural Sciences of Philadelphia, G. Steyskal, United States National Museum, and Utah State Agricultural College (G. F. Knowlton).

The genus *Zodion* in America north of Mexico may be conveniently divided into three groups characterized as follows:

Thorax light colored with black spots .....*pictulum.*
Thorax usually dark with two relatively wide light colored stripes .....Obliquefasciatum Group.
Thorax usually light with relatively narrow dark stripes or unmarked .....Fulvifrons Group.

Some specimens of the Obliquefasciatum Group have the dark thoracic pattern obliterated by white pollen so as to resemble species of the Fulvifrons Group very closely, and have been so identified in collections. Such individuals may be distinguished

by the absence of any trace of the pair of anterior submedian thoracic lines usually present in the Fulvifrons Group species, and by the specific abdominal patterns of the species of the Obliquefasciatum Group. The female genital plate is very short, wide, and thick, more so than in any of the species of the Fulvifrons Group examined. The striations (rows of short, closely set bristles) completely cover the posterior surface of the plate so as to meet the striations of the sixth sternite.

The great amount of variation in *Zodion obliquefasciatum* with its melanistic phase has prevented the recognition of the following new form which may be known as:

Zodion cyanescens new species.

Female: Length 10 mm. Face, cheeks, and lower occiput yellowish white, slivery along the adjacent orbits. Width of cheeks ½–¾ times the eye-height. Lower two-thirds of the front orange yellow, upper one-third of front brown to black. Upper occiput brown with orange medially to entirely black, covered with yellowish gray pollen. Antennae orange, the first joint more brownish, the second joint more yellowish. Arista orange, the base black. Proportions of the antennal joints approximately 1:3:2. Proboscis black, 1¾–2 times the head-height. Palpi black, with black hair, as long as the greatest width of the proboscis. Thorax black; reddish at humeri, base of wings, and venter of the scutellum; yellowish pollinose pleural stripe, sides of mesonotum, pair of dorsal stripes, and dorsum of the scutellum. Abdomen black, reddish at very base of 1st segment and brownish at the lateral margins of the 1st, 2nd, and 3d segments, covered with oblique light bluish pollinose markings as follows: 2nd segment confluent dorsally and narrowing to a stripe along lateral posterior edge, 3d segment widely separated dorsally, 4th segment all but two triangular spots dorsally and anterior corners, 5th segment dorsal distal portion, 6th segment most of dorsal surface. Coxae reddish, yellow pollinose anteriorly, brown to black posteriorly. Femora red, brown to black dorsally and yellow pollinose ventrally. Tibiae largely yellow pollinose. Tarsi blackish, yellowish ventrally, at base, and at sides of the segments. Pulvilli yellow;

claws yellow with black tips. Wings dark gray, veins brown to blackish, except at base. Base of wings yellowish orange; calypters yellow. First posterior cell open (usually) or closed at the margin. Halters yellow orange.

Male: Similar to the female, but black of the abdomen more extensive, and the pollen on the distal portion of the abdomen more whitish. One abnormally small male is 7 mm. long.

Closest to *Zodion obliquefasciatum* which it replaces in the southeastern states, from which it differs by the darker color in general, and the bluish instead of white pollinose markings and black rather than rufous coloration of the abdomen.

Holotype: Female, NORTH CAROLINA: Smokemont, July 20, 1923, J. C. Crawford. *Allotype:* Male, North Carolina, Smokemont, July 20, 1923, T. B. Mitchell. [Both from the North Carolina Department of Agriculture; deposited in the Field Museum.] *Paratypes:* Male, New Jersey: Riverton, C. W. Johnson, [Am. Mus.]; three males, N. C.: Tarboro, July 30, 1924, T. B. Mitchell or W. B. Mabee (on *Helenium tenuifolium*), [N. C. Dept. Ag., one deposited in Kansas U. Coll.]; female, N. C.: La Grange, Aug. 27, 1921, T. B. Mitchell, [N. C. Dept. Ag.]; two males, N. C.: Willard, July 6, 1922, T. B. Mitchell (on *Senecio*), [N. C. Dept. Ag., one in author's coll.]; four males, N. C.: Raleigh, July 18–22, 1918–26, C. S. Brimley, [N. C. Dept. Ag., one in the Acad. Nat. Sci.Phila., one in Calif. Acad. Sci.]; male, N. C.: Statesville, mid July, 1919, F. Sherman, [N. C. Dept. Ag.]; female, N. C.: Newton, July 25, 1921, T. B. Mitchell, [N. C. Dept. Ag., in author's coll.]; female, N. C.: Swannanoa, July 10, 1913, C. L. Metcalf, [N. C. Dept. Ag.]; male, N. C.: Hendersonville, July 8, 1926, J. C. Crawford, [N. C. Dept. Ag.]; male, N. C.: Raleigh, July 8, 1903, P. Morse Coll., [M. C. Z.]; male, North Carolina, Morrison, [Nat. Mus.]; female, S. C.: Florence, July 19, 1935, C. F. Rainwater, [Nat. Mus.]; female, Ga.: Atlanta, Aug. 9, 1938, P. W. Fattig, [Nat. Mus.]; male, Fla.: Monticello, Aug. 16, C. Fairchild, [M. C. Z.]; female, Miss.: Utica, Aug., [Nat. Mus.]; male, Miss.: West Point, Sept. 16, 1904, F. C. Bishopp, [Nat. Mus.].

Most of the specimens correspond to the "melanistic" phase of *obliquefasciatum* described below, but three of the males are analogous to the "rufous" phase of that species by virtue of the brownish instead of the black of the proximal abdominal segments. These represent variation toward *obliquefasciatum*. Several specimens of *obliquefasciatum* from Illinois show variation toward the new species, one in particular having rather bluish pollen and very little rufous on the abdomen. Other intermediate specimens will undoubtedly be found where the ranges of the two species meet.

It was a dark specimen of *cyanescens* from Alabama that caused Kröber (Arch. Nat., *81*A, h. 4, p. 104) to question the validity of *Zodion albonotatum*.

ZODION OBLIQUEFASCIATUM (Macquart)

Myopa obliquefasciata Macquart, Dipt. Exot., Suppl. 1, 141, 1845. [Texas.]

Zodion splendens Jaennicke, Neue Exot. Dipt., 405, 1867. [Mexico.]

Zodion leucostoma Williston, Trans. Conn. Acad. VI, 380, 1885. [Western Kansas.]

This species is characterized by the rufous abdominal coloration with white pollinose markings. It is an extremely variable species, most of the individuals of which fall into one of three main types as follows:

"Melanistic" phase: Darker individuals averaging larger in size, in which the abdomen has relatively wide black markings.

"Rufous" phase: Lighter individuals averaging intermediate in size, in which the abdomen is mainly rufous with brown markings, or some blackish markings on the distal segments.

"Pollinose" phase: Very light individuals averaging smallest in size, in which the abdomen is usually rufous, and whose dark thoracic pattern is covered with gray or whitish pollen leaving two or three dark stripes. These are the individuals which resemble species of the Fulvifrons Group.

The distribution and frequency of the phases is as follows: Illinois (26 M, 9 R), Iowa (1 M, 1 R), South Dakota (1 M), Nebraska (1 M, 1 R), Kansas (1 M, 1 R, 1 M–R, 1 M–R–P),

Arkansas (1 R), Louisiana (1 R), Texas (5 M, 7 R, 1 P, 1 M–R), New Mexico (2 M, 4 R, 2 P, 1 R–P), Arizona (2 P), Colorado (1 M, 10 R, 10 P, 1 M–R, 1 M–P, 1 R–P), Utah (2 R), Nevada (4 R), California (9 R, 1 P, 1 M–R).

ZODION ALBONOTATUM Townsend.

Zodion albonotatum Townsend, Jour. N. Y. Ent. Soc. V, 175, 1897. [Brownsville, Texas.]

This species is characterized by the presence of yellowish pollen on the distal abdominal segments, and by the absence of any rufous. The base of the abdomen may have some bluish pollen. The abdomen also lacks the oblique pattern of the markings of the two previous species.

Material examined:

Arizona: Tucson (1 ♀, melanistic phase); Colorado: Jim Creek, near Boulder—6,400′ (2 ♂, pollinose phase).

Notes on Hubbellia marginifera (Orthoptera: Tettigoniidae)

By JOHN W. H. REHN, Academy of Natural Sciences of Philadelphia

Upon receiving some additional material of the interesting and rare North American katydid, *Hubbellia marginifera* (Walker), studies were started to ascertain its relationship to other forms of the group. However, it has been impossible to complete this work at present, but it is thought advisable to publish such distributional and ecological information as has been gathered, and to note certain variation observed.

Four additional females of this species were collected two miles north of Myrtle Beach, Horry County, South Carolina, between July 22 and 26, 1940 by J. W. Cadbury III. The only other exact locality from which the species is known is "Camp Torreya," Township 2 N–R 7 W, Liberty County, Florida. A single female was taken at this locality in 1925 by T. H. Hubbell, and was described by Hebard [1] as the synonymous *praestans*. Uvarov [2] in 1940 pointed out the synonymy of

[1] Trans. Amer. Entom. Soc., LIII, p. 3, [1927].
[2] Fla. Ent., XXIII, p. 11, [1940].

Hebard's name with the much older *marginifera* of Walker, which was said to have come from Africa (Mr. Vigors' collection).

The following description of the habitat where the additional material was collected has been obtained from the collector, and it appears to represent a different set of conditions from those observed at the "Camp Torreya" site. Two miles north of Myrtle Beach, and about 2000 feet from the ocean, is an area of dry oak barrens surrounded by large open grassy areas, this formerly pine forest which had been burned, also small open tracts with scrubby oak, a few fair sized oak trees, and some long leaf pine. Topsoil was sandy with occasional black muck patches. The specimens were collected at bait, on both oaks and pines, in the thicker portions of the woods, between 10 P.M. and 2 A.M. on moonlit nights. The temperature at this time varied between 75° and 85° F. The individuals were easily captured, making no real attempt to escape.

The following table shows the size variation shown by these individuals, the type of Hebard's *praestans,* and, as far as is possible, by Walker's type.

	Length of body	*Length of pronotum*	*Posterior width of pronotum*	*Length of tegmina*	*Greatest tegminal width*	*Length of ovipositor*	*Length of anterior femur*	*Length of posterior femur*
July 22.....	30.6 mm.	8.0 mm.	5.2 mm.	27.0 mm.	8.0 mm.	30.3 mm.	9.5 mm.	25.5 mm.
July 23.....	31.0	8.0	5.6	27.8	7.8	31.3	9.2	25.2
July 24.....	31.8	7.8	4.9	27.0	7.6	29.0	8.9	24.8
July 26.....	29.8	8.8	5.6	28.8[2]	7.8	32.9	9.5	26.9
type of *praestans*....	30.5	8.3	4.7	25.3	6.7	31.3	9.7	26.0
type of *marginifera*..	13 lines, expansion of wings 28 lines							

With the four South Carolina specimens and the type of *praestans* before me I have noted the following significant variation; decided variation in the shape of the posterior margin of the pronotum, some variation in the width of the vertex, and slight variation in the degree of curvature of the ovipositor. In addition certain variation has been noted in coloration, but this seems clearly due to fading in certain individuals.

It is hoped that before long additional material of this species may be collected and that specimens of the unknown male sex may be found.

[2] Spread specimen.

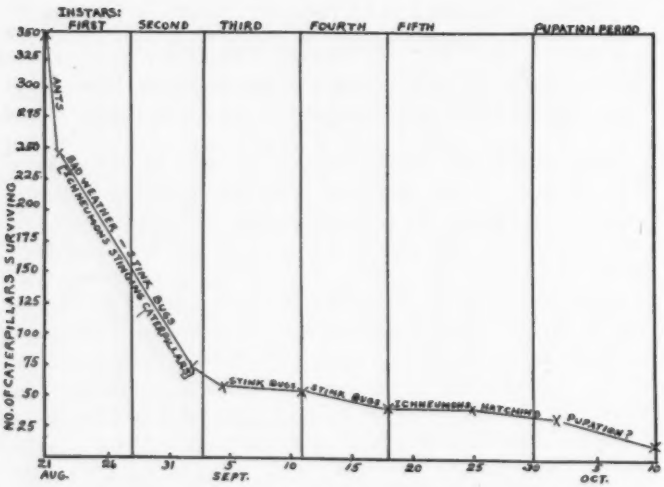
Ecologic Studies of Ceratomia catalpae Larvae (Lepidoptera; Sphingidae).

By C. Brooke Worth, Edward Martin Biological Laboratory, Swarthmore College, Swarthmore, Pennsylvania.

Several years ago I concluded, on the basis of parasitologic investigations on the larvae of *Ceratomia catalpae*, that the adult female moths must lay more than 12.5 eggs apiece per annum in order to survive the toll exacted by a hymenopterous wasp, *Apanteles congregatus*. The number of additional eggs required to furnish species-protection against other hazards was not estimated.[1] That these hazards are formidable is indicated, however, by the fact that on August 16, 1940, at Princeton, New Jersey, I discovered an egg mass of this species containing 369 eggs. At this rate there were 356.5 eggs consigned to almost complete destruction by forces other than ichneumonic infestation. There was no way of knowing, moreover, whether this was the total complement of eggs laid by that individual moth. But despite the latter deficiency in my information, I determined at once to study the course of the 369 eggs, in hopes of finding what factors would contribute to each one's eventual successful or fatal history. The reader is referred to an appended chart which shows how adversities of weather, accidents in ecdysis, and onslaughts of ichneumon wasps and stink bugs wrought havoc among the caterpillar population, to such an extent that only a small percentage of them was able eventually to pupate.

On August 21 most of the eggs hatched. Fertility was in excess of 99%. A few caterpillars died due to their eggs being deeply buried in the egg mass; although they were fully viable, they could not escape from the morass of hatched eggshells that surrounded them. A few other caterpillars emerged in feeble condition; these were promptly carried off by a company of ants that, attending nearby aphids on the catalpa sapling, were alert to whatever usable provender might occur accidentally in their domain.

[1] *Entomological News*, May, 1939, pp. 137–141.



Thus about 350 *C. catalpae* larvae ultimately began their free existence on the undersurface of a single catalpa leaf. Each one's first feeding-act was to gnaw a single round hole, 1 mm. in diameter, at its station on the leaf. Since the caterpillars were crowded closely together, the leaf quickly became riddled with small holes.

The ants attempted to attack able-bodied caterpillars, but despite their diminutive size the latter were able to ward off these enemies by lashing vigorously from side to side. The caudal spines of the larvae were proportionately much longer and more slender and pointed than is the case of caterpillars in the final instar. Possibly the appendages look that much the more threatening at this early stage and serve thereby to render increased protection to their truly defenseless bearers.

A tiny ichneumon wasp appeared among the larvae a few hours after they had hatched. How this insect was apprised of its prey so quickly is truly an entomological conundrum. One wonders whether it had been watching the eggs as expectantly as I; whether it detected the presence of young caterpillars by some special and peculiar sense of its own; or whether

it stumbled upon the colony while making routine inspections of all the catalpa foliage in that neighborhood. In the latter case one must conclude either that coincidence operated rarely to bring the wasp to this particular station so speedily, or that such wasps are extremely numerous and widespread.

While the ichneumon patrolled the larva-bearing leaf thoroughly on the caterpillars' birthday, it did not approach any of the tiny "worms" with egg-inoculating intent.

On the next morning I found that about 100 of the caterpillars had disappeared. This, the greatest single populational catastrophe experienced by the colony, remains mysterious in its etiology. I suspect, however, that ants must have been the agents in the mass slaughter, for by this time many of those flightless insects had arrived to inspect the ranks of young caterpillars and especially to glean remaining parturient juices from the otherwise empty ancestral egg-cluster.

On this second morning an ichneumon wasp also was present, now busily parasitizing many larvae. It darted quickly into the colony, "stinging" a caterpillar in the fraction of a second, then retiring for a minute or two to a neighboring leaf. The victimized caterpillars lashed furiously upon being pierced by the wasp's ovipositor, but their demonstrations were always too late, so fleet were the ichneumon's deadly visits.

On the third day, August 23, the caterpillars dispersed over all the leaves of their catalpa branch, the majority of them selecting tender leaves near its tip. They were now massed in groups of 30 or 40, so that an ichneumon's attentions to caterpillars on any one leaf gave other groups of larvae transient immunity from attack.

The next few days were attended by unremittingly heavy rain, as a result of which the caterpillars were unable to feed properly. They spent most of the time resting quietly on the protected undersurfaces of their leaves. Quite a number of them died, either through starvation or by drowning in raindrops. Several large leaves were stripped from the tree by strong winds. On one such leaf I counted 22 caterpillars. None of the derelict larvae succeeded in finding its way back to the tree, wherefore all such unfortunate ones died.

A few days after the first storm another arrived to cause further mortality among the colony due to falling leaves. The caterpillars were now undergoing their second molt and, though they had achieved greater size and strength, they were not able because of their resting condition to attempt the journey back to their tree. Therefore these, too, died. On September 2 only 75 of the original 350 *C. catalpae* larvae remained on the tree. A mortality of about 78.5% had visited the colony during its members' first two instars. By far the greatest single cause of death had been inclemencies of weather.

But henceforth the remaining caterpillars faced their environment with greater opportunities for survival. They were attaining a significant size and appeared fully vigorous. Their depletion, moreover, now operated to the survivors' advantage by giving insurance against defoliation of the catalpa sapling. Although the natal branch was eventually stripped, other branches provided more than adequate sustenance for the larvae throughout the remainder of their feeding period.

A constant though minor scourge of the caterpillars, from the second instar onward, was the carnivorous action of stink bugs. Two or three of these insects were usually present, systematically sucking the juices from caterpillar after caterpillar. On being partially bled to death, the weakened caterpillars let go their hold on the leaf; there they would hang from the stink bug's hypodermic proboscis until that bloated enemy dropped the deflated caterpillar to the ground. During the third and fourth instars of the *C. catalpae* colony, stink bugs were practically the only cause of continued mortality.

Tiny ichneumon wasps were seen "stinging" caterpillars as late as in the third instar. Ultimately, when ichneumon maggots burrowed outward through the caterpillars' skins, I observed that the period of their emergence occupied about two weeks. Presumably the parasitic larvae had a relatively constant time for development—about 32 days. In the case of caterpillars that were "stung" during their third instar, it seemed to me that their final (fifth) instar was prolonged in order to permit the ichneumon larva's orderly development.

These late-victimized larvae ceased feeding when their unparasitized siblings descended to the ground to pupate. Remaining plump and in good color, they clung inactively to their leaves for as long as ten days, unable to develop further, and inhibited from natural behavior by their burden of ichneumon inhabitants.

The small ichneumon wasps enjoyed a symbiotic relationship with the catalpa tree. I thought at first that this represented an accidental advantage conferred by ants upon ichneumons, but subsequent investigations proved otherwise. Ants originally attended aphids on the catalpa sapling. Later the aphids disappeared, but ants continued to frequent all parts of the catalpa, gleaning honey-like secretions from "nectaries" at the angles of veins branching from the midrib of each leaf. The nectaries consisted of hypertrophied cellular excrescences within the areas distal to each acute angle, such sites resembling tumorous growths on the leaves' nether surfaces. My original conclusion was that ants had produced these seeping organs through chronically prolonged biting, but during the next winter I "forced" several catalpa branches in a greenhouse that was inaccessible to insect-visitation, and the resulting leaves were provided with identical nectaries.

Thus the secretions upon which ichneumon wasps fed were produced without stimulation by ants—were furnished, in fact, as a natural botanical phenomenon. One may therefore postulate that the catalpa has found it profitable through natural selection to conserve such of its members as have afforded sustenance to the enemies of its specifically-adapted browsers, of which *Ceratomia catalpae* caterpillars surely rank foremost.

Ants have secondarily taken advantage of the host-tree's beneficence. Whereas catalpas are suitable for the rearing of aphids in the same manner that many plants yield, upon being pierced by insects' sharp proboscides, a nutrient sap,—other plants even presenting such manna to insects as a freely-exuded offering over the general leaf-surface,—the catalpa makes its contribution through the agency of specialized honey-organs or nectaries. This apparently has led to a diminution of ants' solicitude toward aphids on the catalpa, the intermediate ac-

tivities of these hostages being rendered less necessary by the tree's direct provision of comparable nutritive products.

The small ichneumons were less well apprised of the catalpa sap than ants, surprising though this might seem. The wasps perused a leaf with much antennal testing of each part of the leaf's surface, coming upon a nectary only as if by accident. Having fed upon extant juices at such a site, an ichneumon continued further on its exploratory way as if unaware where the next nectary was to be found. Ants, on the other hand, made routine rounds of each leaf, proceding directly to profitable sites in regular succession. Since these insects derive even greater benefits from the catalpa than ichneumons, one is led to wonder whether another ecological settlement is not suggested here—that direct feeding by ants on specifically-provided catalpa secretions is less detrimental to catalpa trees than the indirect and traumatic feasting of ant-attended aphids.

But to proceed with the history of the caterpillars: On September 2 a larger species of ichneumon wasp arrived to threaten the colony. It was about twice as long as the common tiny black ones and was a yellowish-tan in color. It had a prominent sharp ovipositor.

Whereas small ichneumons "stung" their victims with lightning-like celerity, this one had actually to mount its caterpillar and to maintain that stance while depositing its eggs. When I arrived it was just finishing its work on one larva. It was stationed at the forepart of the "worm" facing forward, its ovipositor deeply buried in one of the caterpillar's anterior abdominal somites. The caterpillar lashed from side to side, but the wasp did not let go its footing, and when its egg-laying was completed, it lightly took wing.

It alit on a neighboring leaf and ran about quickly until it encountered a fresh victim. This caterpillar, like the last, was in the process of molting and was not at liberty to move from its silken platform. The wasp approached the caterpillar's rear end, turned around, and gave several investigative taps or thrusts with its sting. The caterpillar responded with violent thrashings from side to side.

After the caterpillar calmed down, the wasp backed into closer range and gave a sharp thrust which actually drew a small drop of green blood from the caterpillar's back. This resulted in further active demonstrations of hostility. The wasp withdrew a few millimeters and lifted its hind legs so that it was entirely out of range of the caterpillar's activities. The wasp's wings were in constant shimmering vibration, so that it was rarely possible for me to see the black markings at the midpoint of the costal edge of the fore-wings. Throughout the wasp's subsequent maneuvers, the wings were never at rest.

The strategy employed seemed to be to tire the caterpillar out. Time and again the wasp's forays were vigorously repelled. But finally the wasp mounted the posterior end of its victim, and with stiletto-like action, it vehemently plunged its ovipositor full into the caterpillar's body. Now the egg *must* be laid, and despite frantic thrashings of the caterpillar, and much to the wasp's cost, the egg *was* deposited. The wasp then withdrew for a momentary rest, but in a twinkling it was again upon the caterpillar.

Thus writhing, the caterpillar was tortured for about 15 minutes, when the wasp flew to the next leaf and selected a third victim.

This species of wasp continued its devastations during the following two days. I noticed that it had no fear of the caterpillars' caudal spines, sometimes actually straddling those appendages during the process of oviposition. Early on the morning of September 4 a wasp was observed easily "stinging" caterpillars that were chilled by a covering of night-distilled dew. On this day there were 60 remaining larvae.

The count gradually diminished thus: 51 caterpillars on September 11; 42 on September 18; and 42 on September 25. On the latter date 27 bore ichneumon cocoons on their backs. Thus only 15 remained as potentially viable members of next year's generation. This fraction represented 4.1% of the original 369 eggs laid by the moth. And it was not certain, yet, how many of the remaining few larvae harbored ichneumon parasites within their body cavities.

At least one fact was demonstrated, however. The female moth in this instance had sacrificed more than twice 12.5 offspring to the biological demands of *Apanteles*. Had the caterpillar colony not lost so many members to conditions of bad weather, the percentage of parasitization would have been far greater than this. Another fact is certain: my figures, based years ago on the extent of parasitization of caterpillars in their last instar, failed to account for the loss of caterpillars to be "expected" by *Apanteles*. In other words not only must maternal *Ceratomia* lay excessive numbers of eggs in order to assure her species' perpetuation, but fertilized *Apanteles* must also extend her activities in proportion to a mortality among *Ceratomia* larvae that necessitates an excessive rate of reproduction of the parasitic wasps as well. The parasitizing diligence of *Apanteles* must also include those cases in which many caterpillars die of starvation due to complete defoliation of their catalpa tree.

As soon as ichneumon cocoons appeared on the catalpa caterpillars' backs, chalcid wasps arrived, actively stinging the ichneumon cocoons. Wishing not to molest the caterpillars, I made no new study of the degree of chalcid-parasitization of ichneumons, but from observations of the superparasites' thoroughness, I concluded that they laid eggs in about half the ichneumon cocoons, exactly as in my former study.

On October 2 only 33 caterpillars remained, 23 of these bearing ichneumon cocoons. Five caterpillars had probably descended to the ground to pupate. Chalcids were still active among the ichneumon cocoons.

On October 9 four more normal caterpillars had disappeared for pupation and four other normal ones remained. The rest either bore cocoons of the small ichneumons or were stunted and lethargic due to internal development of the larger species of wasp. Thus only 13 caterpillars eventually pupated, representing only 3½% of the original number of eggs; and of this remainder some individuals may still have harbored large ichneumon parasites.

One wonders whether mass egg-laying of *C. catalpae* is as efficient as the random dispersal of eggs by members of the *Saturnidae* and some other groups of Lepidoptera. It would seem that *catalpae* colonies are particularly subject to onslaughts of hymenopterous parasites, whereas the chance visits of insectivorous birds must also be feared as particularly potent causes of mass mortality. Possibly the restriction of this species to a single food-plant makes it incumbent upon gravid females to lay all their eggs as soon as they encounter an appropriate leaf for doing so. Nevertheless there are other sphingids, such as the tomato moth, that are equally restricted in respect to larval fodder, but that exercise a more Saturnine lack of concentration in their egg-laying.

The eventual success of this colony, however, in bringing 13 of its members safely to the point of pupation, suggests that the colonial technique of this species may have some especial advantage that has not yet been detected. It is possible. for example, that the caterpillars are unpalatable to birds, when concentration of individuals becomes less of a menace to the species than is true of the various *Saturnidae*. At any rate it would appear that mortality, when high during one period of the colony's history, falls or fails to be as high during compensating periods of immunity to death; and thus an adequate complement of caterpillars eventually reaches winter's underground sanctuary.

I wish to thank Eleanor M. Paxson for preparing the graph that accompanies this study.

Current Entomological Literature

COMPILED BY THE EDITORIAL STAFF.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—ALEXANDER, C. P.—Personalia. [105] 13: 442–43, port. ANNAND, P. N.—Entomological problems imposed by war conditions. [12] 36: 193–200. BOYDEN, A.—Serology and animal systematics. [90] 77: 234–255. BRANSON, F. A.—A preliminary report on the insect orders found in various grassland habitats in the vicinity of Hays, Kansas. [65] 45: 189–94. BUGBEE, R. E.—Notes on animal occurrence and activity in the White Sands National Monument, New Mexico. [65] 45: 315–21, ill. CARPENTER, G. D. H.—The relative frequency of beak-marks on butterflies of different edibility to birds. [93] 111 A: 223–31. CARSTENSEN & JAQUES.—A preliminary study of the insect galls of Iowa. [Proc. Iowa Acad. Sci.] 49: 525–27. CORY, E. N.—Entomology and war (editorial). [12] 36: 355–358. FELT & BROMLEY.—Shade tree insects and protective concealment in military areas. [12] 36: 326–327. FRENCH, A. J.—Apparatus for low power work. [Microscope and Ent. Monthly] 5: 116–118. GIRAULT, A. A.—Personalia. [105] 13: 441–42, port. GRIMES, D. W.—1891–1943. (Obituary) by Clay Lyle. [12] 36: 359. HARKNESS & PIERCE.—The limnology of Lake Mize, Fla. [Proc. Florida Acad. Sci.] 5: 96–116, ill. HOFF, C. C.—Improving taxonomic literature. [49] 18: 201–203. LINSLEY, E. G.—Political versus faunal boundaries in systematic entomology. [19] 98–100. LINSLEY & MICHELBACHER.—Insects affecting stored food products. [Bul. Univ. Cal.] no. 676, 44 pp., ill. MILLER, E. M.—Chemical integrative mechanisms in insect societies. [Proc. Florida Acad. Sci.] 5: 136–47. OGNEV, S. I.—Problems of taxonomy. I. On the importance of morphology in taxonomi-

cal studies. [Zool. Jour., Moscow] 21: 266–81. (Russian, Engl. Sum.) ORFILA, R. N.—Breve cartilla del entomologo aficionado. [Museo Escolar Cent. Parana] 11 pp., ill. OSBORN, H.—Personalia. [105] 13: 440–41, port. RAU, P.—How the cockroach deposits its egg-case; A study in insect behavior. [7] 36: 221–226. RILEY, W. A.—Introduction to the study of animal parasites and parasitism. [Minneapolis, Minn.] 87 pp., printed one side. ROSENFELD, A. H.—1866–1942 (Obituary) by George N. Wolcott. [12] 36: 358. [ROUDABUSH, R. L.]—An old Riley letter. [118] 16: 88. SCOTT, T. L.—Gum chloral, a mounting medium. [Microscope and Ent. Mo.] 5: 122–124. SMITH, R. C.—The eleventh annual insect population summary of Kansas, 1941. [65] 45: 203–20. SMITH & KELLY.—The tenth annual insect population summary of Kansas, 1940. [65] 44: 241–56, 1941. SPENCE, D. S.—Notes on mounting—IV. [Microscope and Ent. Monthly] 5: 101–108. TEALE, E. W.—Insect birthdays. [Fauna, Philadelphia] 5: 33–36, ill. WHITLOCK, J. H.—Practical identification of endoparasites for veterinarians. [Minneapolis] 37 pp., printed one side. WILLIAMS, C. B.—A method of collecting and storing without pressure insects and galls attached to leaves. [107] 18: 1–2, ill. WOLCOTT, A. B.—Personalia. [105] 13: 439–40, port.

ANATOMY, PHYSIOLOGY, ETC.—BARDI & GEORGE.—Digestive glands of the scorpion. [Jour. Univ. Bombay] 11 (5): 91–112, ill. BODINE & ROBBIE.—Physiological characteristics of the diapause grasshopper egg. II. Changes in density and weight during development. [23] 16: 279–286. CRISTOBAL, U. L.—La "filoxera" de la vid y sus formas de reproduccion experimental. [Lab. Zool. Agr., La Plata] Bol. 7: 6 pp., ill. CROWELL, H. H.—Feeding habits of the southern armyworm and rate of passage of food through its gut. [7] 36: 243–249. DENNELL, R.—Pore canals of the insect cuticle. [Nature, London] 152: 50–51, ill. DITMAN, VOGHT & SMITH.—Undercooling and freezing of insects. [12] 36: 304–310. FESTER & LEXON.—Colorantes de insectos. [106] 135: 89–96, ill. FRAENKEL & GUNN.—The orientation of animals: Kineses, taxes and compas reactions. [Oxford, Engl.] 352 pp., ill., 1940. GOOD, C. M.—The genetics of the grouse locust, Tettigidea parvipennis. [65] 44: 234–37, 1941. NEEDHAM, J.—Biochemistry and morphogenesis. [Camb. Univ. Press, 1942] 785 pp. POPHAM, E. J.—Further experimental studies of the selective action of predators. [93] 112 A: 105–17. The variation in the colour of certain species of Arctocorisa and its significance (Hemip., Corixid). [93] 111 A: 135–72. POWER

& MELAMPY.—Dimorphism in the female honeybee (Apis mellifera): Development of the metathoracic tibia. [7] 36: 227–237, ill. RICHARDS & OXLEY.—The ejection of frass by larvae of Calandra under the influence of CO_2. [107] 18: 22–24. VILLEE, C. A.—Phenogenetic studies of the homoeotic mutants of Drosophila melanogaster. I. The effects of temperature on the expression of aristapedia. [42] 93: 75–98, ill. WADDINGTON, C. H.—The pupal contraction as an epigenetic crisis in Drosophila. [93] 111 A: 181–98, ill. WILLIAMS, BARNESS & SAWYER.—The utilization of glycogen by flies during flight and some aspects of the physiological ageing of Drosophila. [92] 84: 263–272. WITHERSPOON, W.—Spermatid transformation in Orchelimum nigripes (Orthoptera). [65] 44: 434–47, ill., 1941. ZEUNER, F. E.—On the venation and trecheation of the lepidopterous fore wing. [75] 10: 289–304, ill.

ARACHNIDA AND MYRIOPODA—BRANCH, J. H.—Notes on California spiders. III. [38] 42: 34–38. CAUSEY, N. B.—Studies on the life history and the ecology of the hothouse millipede, Orthomorpha gracilis. [119] 29: 670–82. EATON, T. H.—Biology of a mull-forming millipede, Apheloria coriacea. [119] 29: 713–23, ill. GINETZINSKAYA, T. A.—A new form of adaptation of feather mite, Freyana anatina, to the moult of the host. [C. R. Acad. Sci. URSS.] 37: 146–49, ill. GOODNIGHT & GOODNIGHT.—New and little known phalangids from the U. S. [119] 29: 643–56, ill. KEEGAN, H. L.—Observations on the Pentastomid, Kiricephalus coarctatus (Diesing) Sambon 1910. [Trans. Amer. Micr. Soc.] 62: 194–199, ill. KAGAN, M.—The Araneida found on cotton in central Texas. [7] 36: 257–258. LOOMIS, H. F.—New cave and epigean millipeds of the U. S., with notes on some established species. [26] 92: 373–410, ill. (*). LYFORD, W. H.—The palatability of freshly fallen forest tree leaves to millipeds. [84] 24: 252–261. MELO-LEITAO, C.—Novos solifugos do Chile e do Mexico. Oito novos laniatores do Ecuador. [15] 14: 305–13; 315–25, ill. (*). MICHELBACHER, A. E.—Petunia, an important winter host of the tomato mite. [55] 19: 73.

THE SMALLER ORDERS—AUGUSTSON, G. F.—A new subsp. of Orchopeas sexdentatus (Siphonap.). [38] 42: 49–51, ill. BANKS, N.—Notes and descr. of Nearctic Trichoptera. [26] 92: 341–69, ill. (*). BYERS, C. F.—Notes on the emergence and life history of the dragonfly, Pantala flavescens. [Proc. Florida Acad. Sci.] 5: 14–25, 1941. COSTA LIMA, A. DE.—Insectos do Brasil. IV. Panorpatos, Suctorios, Neurop-

teros, Trichopteros. 141 pp., ill. DENNING, D. G.—The Hydropsychidae of Minnesota. (Trichoptera.) [70] 23: 101–171, ill. (k *). GEIJSKES, D. C.—Notes on Odonata of Surinam. IV. Nine new or little known zygopterous nymphs from the inland waters. [7] 36: 165–184, ill. GRUNDMANN, BOLES & ACKERT.—Plague flea, Xenopsylla cheopsis, in Kansas. [65] 44: 238–40, 1941. HANSON, J. F.—Records and descr. of N. A. Plecoptera. [119] 29: 657–69, ill. (*). HILTON, W. A. —Acerentulus from Kansas. [13] 35: 20–21, ill. (*). HUBBARD, C. A.—The fleas of California, with checklists of the fleas of Oregon, Washington, B. Columbia, Alaska, Idaho, Nevada, Arizona. [Pacif. Univ. Bull.] 39 (8): 12 pp. KENNEDY, C. H.—A dragonfly nymph design on Indian pottery. [7] 36: 190–191, ill. Lestes henshawi, Ecuador, L. urubamba, Peru, and notes on other S. Am. Lestes (Odonata). [105] 13: 274–90, ill. LYMAN, F. E.—Swimming and burrowing activities of mayfly nymphs of the genus Hexagenia. [7] 36: 250–256. NEEDHAM, J. G.—Life history notes on Micrathyria. [7] 36: 185–189, ill. O'HARRA & ADAMS.—The mouth-parts of the firebrat, Thermobia domestica (Thysan.). [Proc. Iowa Acad. Sci.] 49: 507–16, ill. RICKER, W. E.—Stoneflies of southwestern British Columbia. [Indiana Univ. Pub., Sci. Ser.] no. 12: 145 pp., ill. (*). WALKER, E. M.—The subarctic Odonata of North America. [4] 75: 79–90, ill. WRIGHT, M. —The effect of certain ecological factors on dragonfly nymphs. Additions to the list of Odonata from Tennessee. [49] 18: 172–96; 211–12.

ORTHOPTERA—LIEBERMANN, J.—Contribucion a la zoogeografia, taxonomia y ecologia de los acridoideos de Entre Rios. [Prov. de Entre Rios, Min. de Hac. Just. e Instruc. Publ., Parana] 39 pp., ill. REHN, J. A. G.—The Aucacres, a new group of So. Amer. locusts (Acridid). [41] 95: 33–51, ill. (*). SEVERIN, H. C.—Earwig in South Dakota. [19] 38: 110. SLIFER, E. H.—The internal genitalia of female Tetrigidae, Eumastacidae and Proscopiidae. [57] 73: 89–102, ill.

HEMIPTERA—COMPERE, H.—A n.sp. of Metaphycus parasitic on psyllids. [55] 19: 71–3. CHINA & PARSHLEY.—General catalogue of the Hemiptera. Fasc. IV, pt. 3, Fulgoroidea, Araeopidae (Delphacidae). 552 pp. DRAKE, C. J.—A list of the species of Monanthia Lep. and Serv. of the western hemisphere, including description of a new species. (Tingitid.) [10] 45: 141–142. DRAKE & HARRIS.—A new Brachymetra from Venezuela (Gerrid). [46] 1: 94–5. FUNKHOUSER, W. D.—Two new Membracidae from Arizona. [19] 38: 75–77.

ill. GURNEY, A. B.—A synopsis of the Psocids of the tribe Psyllipsocini, including the descr. of an unusual new genus from Arizona. [7] 36: 195–220, ill. HARRIS, H. M.—New Neididae from S. Amer., with notes on some little known sps. [Ann. Carnegie Mus.] 29: 443–50. KNIGHT, H. H.—Five n.sps. of Dicuphus from western N. Am., and one new Cyrtopeltis (Mirid). [55] 19: 53–8. KNOWLTON, G. F.—Nabis roseipennis feeding records. [19] 38: 108. PELAEZ, D.—Estudio sobre Membracidos. IV. [121] 3: 355–58, ill. (S). PRENDERGAST, B.—Observations on the sand dune chinch bug (Blissus mixtus). [55] 19: 59–60. RICHTER, L.—Contribucion al conocimiento de los Membracidae de Colombia. [Caldasia, Bol. Inst. Cien. Nat. Univ. Nac. Colombia] 4: 81–112, ill. (*). SCHWITZGEBEL & WILBUR.—Lepidoptera, Hemiptera, and Homoptera associated with ironweed, Vernonia interior, in Kansas. [65] 45: 195–202. SEABRA & HATHAWAY.—Especies de Vescia do Brasil (Reduvid). [111] 37: 539–41, ill. USINGER, R. L.—Types of apterous Aradidae. [55] 19: 60. Key to the gen. & sps. of Vesciinae, with desc. of two n.sps. (Reduvid). [105] 13: 290–96 (S). VENABLES & WADDELL.—The influence of leguminous plants on the abundance of the tarnished plant bug. [4] 75: 78. RUSSELL, L. M.—A new genus and four new species of whiteflies from the West Indies. [10] 45: 131–141, ill. (k).

LEPIDOPTERA—BEIRNE, B. P.—The distribution and origin of the British Lepidoptera. [Proc. R. Irish Acad.] 49B: 27–59, ill. BUSCK, A.—Henricus, a new name for a Phaloniid genus. [38] 42: 38. COMSTOCK & DAMMERS.—Western popular sphinx. California sps. of Smerinthus with notes on the early stages of S. cerisyi opthalmicus. [38] 42: 39–41; 42–45, ill. COMSTOCK & HENNE.—The larva of Copicucullia basipuncta. [38] 42: 45–46, ill. EVANS, W. E.—A key to the Amer. sps. of the gen. Pyrgus (Hesperid). [105] 13: 359–66. GEROULD, J. H.—Genetic and seasonal variations of orange wing-color in Colias butterflies. [Proc. Amer. Phil. Soc.] 86: 405–38, ill. HAYWARD, K. J.—El gusano chupador de la cana de azucar (Diatraea saccharalis) en Tucuman. [Bol. Esta. Exper. Agric. Tucuman] no. 38: 25 pp., ill. HENDERSON, W. F.—Lepidoptera and leisure. [Chicago Nat.] 6: 27–28, ill. McDUNNOUGH, J.—Phalaenid notes and descriptions. [4] 75: 59–62. MACKAY, M. R.—The spruce foliage worm and the spruce cone worm (Dioryctria spp., Pyralid). [4] 75: 91–98, ill. MARTIN, L. M.—Polites sonora siris, raised from the synonymy. [38] 42: 46–48. MARTIN, M. DE.—La coleccion de lepidopteros del Museo. [66] 6: 343–48. MEADOWS, D.—

Digging for butterflies. [Nature Mag., N. Y.] 36: 361–68, ill. MICHENER, C. D.—Some systematic notes on the Libytheidae. A review of the gen. Calisto (Satyrid). [40] nos. 1232, 1236: 2 pp.; 6 pp., ill. (S *). SCHWITZGEBEL & WILBUR.—(See under Hemiptera.) WILLIAMS, C. B.—A safe method of measuring the wings of butterflies. [107] 18: 3–5, ill.

DIPTERA—ALEXANDER, C. P.—Records and desc. of Brazilian Tipulidae. VIII. [105] 13: 421–37, ill. (*). AUGUSTSON, G. F.—A new parasitic fly from bats (Pupipara). [38] 42: 52–53, ill. BARRETO & COUTINHO.—Processos de captura, transporte, disseccao e montagem de flebotomos. [126] 6: 15–30, ill. Contribuicao ao conhecimento dos flebotomos de Sao Paulo. II. Desc. P. limai; P. ayrozai & amarali n.sps. (Psychod.). [126] 6: 33–43, ill. BEAVER, P. C.—A tray for collecting anopheline larvae. [17] 29: 229, ill. BEQUAERT, J.—The Diptera Pupipara of Venezuela. [46] 1: 79–88. BROOKS, A. R.—A review of the Canadian species of Ernestia sens. lat. (Tachinid.). [4] 75: 66–78, ill. (k *). COLLIN, J. E.—Note on Mr. Sabrosky's article on Madiza. [8] 79: 107–108. COUTINHO & BARRETO.—Contribuicao para o conhecimento dos flebotomos de Sao Paulo. III. Desc. P. alphabeticus; & P. pascalei n.sp. (Psychod.). [126] 6: 47–57, ill. COUTINHO & FARIAS.—Anopheles (Ayrozamyia) tibiamaculatus, descr. do macho e criacao de n.subg. (Culicid). [15] 14: 343–47, ill. COWAN, I. McT.—Notes on the life history and morphology of Cephenemyia jellisoni and Lipoptena depressa, two dipterous parasites of the Columbian black tailed deer. [52] 21 (D): 171–87, ill. EADS, R. B.—The larva of Culex abominator. [12] 36: 336–337, ill. GORHAM, R. P.—A new mosquito record [Chaoborus crystallinus in New Brunswick]. [Acadian Nat.] 1: 49. HARMSTON & KNOWLTON.—New species of Parasyntormon from the United States (Dolichopodid). [4] 75: 63–65. Five new western Dolichopodidae. [19] 38: 101–107. HULL, F. M.—New sps. of flies of the gen. Baccha and Rhinoprosopa (Syrphid). [91] 33: 214–16, (S). KNUTSON, H.—The status of mosquitoes of the Great Swamp in Rhode Island during 1942. [12] 36: 311–319. LOPES, H. DE S.—Sobre o gen. Lipoptilocnema, com a desc. de uma n.sp. (Sarcophagid). [105] 13: 296–303 (S). PECHUMAN, L. L.—Notes on the biology of Chyliza notata. [19] 38: 97. PRITCHARD, A. E.—Revision of the genus Cophura. [7] 36: 281–309 (*). REES, D. M.—The mosquitoes of Utah. [Bull. Univ. Utah] 33 (7): 99 pp. REINHARD, H. J.—New Tachimidae from northeastern U. S. [19] 38: 78–90. ROGERS, J. S.—The crane flies (Tipulidae) of the George Reserve, Michigan. [Miscel. Publ., Mus.

of Zool., Univ. of Mich.] No. 53. 128 + 8 pls. Ross, E. S.—The identity of Aedes bimaculatus and a new subspecies of Aedes fulvus from the United States. [10] 45: 143–151, ill. ROZEBOOM, L. E.—Phlebotomus anduzei, a new P. from Venezuela. [46] 1: 91–4, ill. SABROSKY, C. W.—Further notes on Madiza. [8] 79: 106–107. STAINS & KNOWLTON.—A taxonomic and distributional study of Simuliidae of western U. S. [7] 36: 259–280, ill. (*). TOWNSEND, C. H. T.—On the Nyssorhynchus complex. [7] 36: 192–194. Two n. reared S. Amer. flies. [105] 13: 438–39. VARGAS, L.—Los subgéneros Americanos de Anopheles. A. (Russellia) xelajuensis, n. subgen. y A. (Coelodiazesis) fausti n.sp. [56] 4: 57–77, ill.

COLEOPTERA—BOLIVAR Y PEILTAIN.—Estudio del primer Trechinae ciego hallado en cavernas de Mexico. [121] 3: 349–54, ill. (*). BONDAR, G.—Notas entomologicas da Baia. X. [105] 13: 225–74, ill. (*). CALLAN, E. McC.—Notes on cassava weevil-borers of the gen. Coelosternus (Curcul.). [105] 13: 304–8. CARTWRIGHT, O. L.—Synonyms of Ataenius spretulus. [19] 38: 108. FENDER, K.—Studies in the Cantharidae. [55] 19: 63–9, ill. (*). FISHER, W. S.—A n.sp. of Buprestidae from Venezuela. [46] 1: 89–90. LEECH, H. B.—Berosus exilis, a Hemiosus. [55] 19: 61–2. LINSLEY, E. G.—Attraction of Melanophila beetles by fire and smoke. [12] 36: 341–342. LINSLEY & MICHENER.—Observations on some Coleoptera from the vicinity of Mt. Lassen, Cal. [55] 19: 75–9. MALKIN, B.—Zuphium americanum in Oregon. [55] 19: 52. Some new records of Oregon Chrysomelidae. [55] 19: 74. PAPRZYCKI, P.—Datos para la captura y crianza del mas grande de los cerambicidos "Macrodontus cervicornis" en la selva peruana. [66] 6: 349–51. PARK, O.—A preliminary study of the Pselaphidae of Mexico. [Bul. Chicago Acad. Sci.] 7 (3): 171–26, ill. (*). PRATT, R. Y.—Insect enemies of the scarabaeid Polyphylla crinita. [55] 19: 69–70. SAILSBURY, M. B.—The comparative morphology and taxonomy of some larval Criocerinae. [19] 38: 59–74. SCHOOF, H. F.—The gen. Conotrachelus in the north central U. S. (Curculionid). [Ill. Biol. Monogr.] 19 (3): 170 pp., ill. (*). SOUKUP, J.—Apuntes para la zoogeografia entomologica. [66] 6: 302–42. VAN DYKE, E. C.—New sps. of west Amer. Coleoptera. [55] 19: 41–52.

HYMENOPTERA—ATWOOD & PECK.—Some native sawflies of the gen. Neodiprion attacking pines in eastern Canada. [52] 21 (D): 109–44, ill. (k *). BRUES, C. T.—The American species of Rhopalosoma. [7] 36: 310–318, ill. (*). BUGBEE, R. E.—An analysis of local populations in the continental spe-

cies Eurytoma rhois (Chalcid). [65] 44: 228–35, 1941. Dow, R.—Note on the male genitalia of certain Isodontia. [7] 36: 240–242, ill. FERNALD, H. T.—A n.sp. of Chlorion from Cuba. [7] 36: 238–239. HINCKS, W. D.—Nomenclature notes on Braconidae and Aphidiidae. [9] 76: 97–104. KROMBEIN, K. V.—Studies in the Tiphiidae. V. A revision of the West Indian Myzininae. [105] 13: 308–59, ill. (k *). PATE, V. S. L.—Two new nearctic Oxybelus. [19] 38: 91–96. The New World gen. & sps. of the Foxita complex (Sphecid). [105] 13: 367–421 (k *). PYENSON, L.—A destructive apple sawfly new to North America. [12] 36: 218–221, ill. SMITH, H. D.—Laboratory rearing of Microbracon vestiticida Vier. on the bean weevil, with notes on the life history of the parasite. [12] 36: 101–104. SMITH, M. R.—The first record of Leptothorax, subgenus Goniothorax, in the United States, with the description of a new species. [10] 45: 154–156. WHEELER, G. C.—The larvae of the army ants. [7] 36: 319–332, ill.

LIST OF JOURNALS CITED.

4.—Canadian Entomologist. 7.—Ann. Entom. Soc. America. 8.—Entom. Monthly Magazine. 9.—The Entomologist. 10.—Proc. Entom. Soc. Washington. 12.—Journal Economic Entom. 13.—Journal of Ent. & Zool. 15.—Anais Acad. Brasil. Cien., R. d. Janeiro. 17.—Journal of Parasitology. 19.—Bull. Brooklyn Entom. Soc. 23.—Physiological Zoology. 26.—Bull. Mus. Comparative Zool. 38.—Bull., So. Calif. Acad. Sci. 40.—American Mus. Novitates. 41.—Proc. Acad. Nat. Sci. Phila. 42.—Jour. Experimental Zool. 46.—Bol. Entom. Venezolana. 49.—Jour. Tennessee Acad. Science. 52.—Canada. Jour. Research, Ottawa. 55.—Pan-Pacific Entom. 56.—Rev. Inst. Salub. y Enferm. Tropic., Mex. 57.—Journal of Morphology. 65.—Trans. Kansas Acad. Sci. 66.—Bol. Mus. Hist. Nat. "Javier Prado," Lima. 70.—Entomologica Americana. 75.—Annals & Magazine Nat. Hist. 84.—Ecology, Brooklyn. 90.—Amer. Naturalist. 91.—Jour. Washington Acad. Sci. 92.—Biological Bulletin. 93.—Proc. Zool. Soc. London. 105.—Revista de Entom., R. d. Janeiro. 106.—Ann. Soc. Cien. Argentina. 107.—Proc. R. Entom. Soc. London, (A). 111.—Memorias Inst. Oswaldo Cruz. 118.—Ward's Nat. Sci. Bulletin. 119.—Amer. Midland Naturalist. 121.—Ciencia, Mexico. 126.—Arquiv. Higiene Saude Paublica, R. d. Janeiro.

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